We claim:

1. A biodegradable polyurethane elastomer comprising soft segments A and B, and hard segment C, wherein:

the segment A is formed from poly(β - hydroxybutyrate) diol and optional one or more components selected from the group consisting of poly(lactic acid)diol, polyglycolide diol, polylactide diol, polycaprolactone(PCL) diol and poly(lactic/glycolic acid) diol;

the segment B is formed from polyethylene glycol;

the segment C is formed from one or more diisocyanate selected from the group consisting of 1,6-hexamthylene diisocyanate, isophorone diisocyanate and lysine diisocyanate; and

the molar ratio of these segments are: (A+B)/C = 0.8 to 1.2; A/B = 0.1 to 10; and the amount of the poly- β -hydroxybutyrate units in the segment A is 10-100 mol%.

2. The biodegradable polyurethane elastomer of claim 1, wherein the molar ratio of the said segments is: (A+B)/C = 0.9 to 1.1 and A/B = 0.2 to 5.0.

3. The biodegradable polyurethane elastomer of claim 2, wherein the molar ratio of the said segments is: (A+B)/C = 1.0 and A/B = 1 to 5.

4. The biodegradable polyurethane elastomer of claim 1, wherein each of the poly(β -hydroxybutyrate)diol and the optional components selected from the group consisting of poly(lactic acid)diol, polyglycolide diol, polylactide diol, polycaprolactone(PCL)diol and poly(lactic/glycolic acid) diol, has a molecular weight in the range of 200-100000.

5. The biodegradable polyurethane elastomer of claim 1, wherein the segment B is formed from polyethylene glycol with molecular weight of

200-20000.

6. The biodegradable polyurethane elastomer of claim 1, wherein the amount of poly- β -hydroxybutyrate units in the segment A is 50-100 mol%.

7. A process for preparing biodegradable polyurethane elastomers, which comprises the following steps:

1) poly- β -hydroxybutyrate is mixed with a glycol of C_2-C_{18} and alcoholysized under heat reflux;

2) the product of step 1) is purified via extraction to obtain poly(β -hydroxybutyrate)diol oligomer;

3) polyethylene glycol and optional one or more components selected from the group consisting of polycaprolactone diol, poly(lactic acid) diol, polyglycolide diol, polylactide diol and poly(lactic/glycolic acid) diol are added into the poly(β -hydroxybutyrate)diol oligomer, and the mixture is heated under nitrogen protection, and then one or more diisocyanates selected from the group consisting of 1,6-hexamthylene diisocyanate (HDI), isophorone diisocyanate (IPDI) and lysine diisocyanate (LDI) are added into the reaction mass, and the reaction is carried out at 80℃-150℃;

4) the reaction product is cooled and the biodegradable polyurethane elastomer of the present invention is obtained comprising soft segments A and B, and hard segment C, wherein:

the segment A is formed from poly(β - hydroxybutyrate) diol and optional one or more components selected from the group consisting of poly(lactic acid)diol, polyglycolide diol, polylactide diol, polycaprolactone(PCL) diol and poly(lactic/glycolic acid) diol;

the segment B is formed from polyethylene glycol;

the segment C is formed from one or more diisocyanate selected from the group consisting of 1,6-hexamthylene diisocyanate, isophorone diisocyanate and lysine diisocyanate.

8. The process for preparing biodegradable polyurethane elastomers of claim 7, wherein the catalyst for the alcoholysization reaction of step 1) is selected from inorganic acids, organic acids and inorganic alkali compounds.

9. The process for preparing biodegradable polyurethane elastomers of claim 8, wherein the said catalyst is selected from hydrochloric acid, sulfuric acid, phosphoric acid and p-methyl benzene sulfonic acid.

10. The process for preparing biodegradable polyurethane elastomers of claim 7, wherein each of the poly(β -hydroxybutyrate)diol and the optional components selected from the group consisting of poly(lactic acid)diol, polyglycolide diol, polylactide diol, polycaprolactone(PCL)diol and poly(lactic/glycolic acid) diol, has a molecular weight in the range of 200-100000.

11. The process for preparing biodegradable polyurethane elastomers of claim 7, wherein the molecular weight of the polyethylene glycol used in step 3) is in the range of 200-20000.

12. The process for preparing biodegradable polyurethane elastomers of claim 7, wherein the molar ratio of the segments in the polyurethane product is: (A+B)/C = 0.8 to 1.2; A/B = 0.1 to 10; and the amount of poly- β - hydroxybutyrate units in the segment A is 10-100 mol%.